



Europäisches Patentamt

(19)

European Patent

Office européen des brevets



EP 0 922 448 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
16.06.1999 Bulletin 1999/24

(51) Int. Cl.⁶: A61K 7/48

(21) Application number: 98122683.0

(22) Date of filing: 30.11.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 01.12.1997 JP 34577497

(71) Applicant:
SHISEIDO COMPANY LIMITED
Chuo-ku, Tokyo 104-8010 (JP)

(72) Inventors:
• Okamoto, Tohru
c/o Shiseido Research Center 1,
Yokohama-shi, Kanagawa 223-8553 (JP)
• Miyahara, Reiji
c/o Shiseido Research Center 1,
Yokohama-shi, Kanagawa 223-8553 (JP)

(74) Representative:
TER MEER STEINMEISTER & PARTNER GbR
Mauerkircherstrasse 45
81679 München (DE)

(54) A humectant and an endermic liniment

(57) A humectant characteristically comprises a diol represented by the following general formula (I):



Wherein R denotes a straight chain or branched chain alkylene group represented by $-(\text{C}_n\text{H}_{2n})-$ and n denotes an integer 1-3. This a humectant has superior moisture retaining properties and a long lasting skin moisturizing effect, as well as superior usability.

BEST AVAILABLE COPY

DescriptionRelated Application

5 [0001] This application claims the priority of Japanese Patent application No.9-345774 filed on December 1, 1997, which is incorporated herein by reference.

Background of the Invention1. Field of the invention

[0002] This invention relates in general to a humectant and an endermic liniment which contains this humectant, and more particularly to a humectant which has a superior and long lasting skin moisturizing effect and a very good tactile feeling during use (usability), as well as an endermic liniment which contains this humectant.

15

2. The Prior Art

[0003] A normal skin corneum (stratum corneum) usually contains 10-20% of moisture and retains elasticity, flexibility and protective functions. However, when the moisture of the corneum decreases due to changes in the external environment factors such as the temperature and humidity, a condition called dry skin occurs and the skin loses elasticity and protective functions, leading to various troubles.

[0004] Conventionally, hydrophilic humectants have been blended into cosmetics for the purpose of improving or preventing such dry skin.

[0005] The hydrophilic humectants used for this purpose include the polyol type humectants such as dipropylene glycol, polyglycerine, 1,3-butylene glycol, glycerine, and polyethylene glycol.

[0006] However, among these humectants, the triols, the representative example of which is glycerine, have an excellent skin effect on the skin but they have a problem in that their viscosity is so high that blending in enough of them to exhibit the skin moisturizing effect results in stickiness, marring the cosmetic's tactile feeling during use.

[0007] On the other hand, 1,3-butylene glycol and dipropylene glycol have little influence on the tactile feeling during use but they have a low skin moisturizing effect and in particular had the problem of their effect being temporary and not long lasting.

[0008] A generally used method involves the combined use of glycerine, which has a high moisture retaining capability, and 1,3-butylene glycol and/or dipropylene glycol, which have a good tactile feeling during use. However, it has been known that the moisture retaining action decreases as the glycerine content decreases.

[0009] To address the aforementioned problems, the inventors conducted earnest research on the skin moisturizing effect and the molecular structure of polyol for the purpose of achieving an excellent moisture retaining action and an excellent tactile feeling during use at the same time. As a result, the inventors discovered that diol with a specific structure have, in addition to superior usability, a superior skin moisturizing effect and a high rough skin improving action (an excellent skin improving effect on dry and scaly skin) as well as being highly effective in improving small wrinkles on the skin, and also discovered that, by additionally using triol with a specific structure, the moisture retaining action improves even more, the rough skin improving action and the small skin wrinkle improving action improve, and improvement in the tactile feeling during use, a characteristic of triol, is achieved, thus completing the present invention.

Brief Summary of the Invention

45

[0010] The object of the present invention is to provide a humectant which is superior in both its usability and skin moisturizing effect, and also to provide an endermic liniment containing this humectant which is superior in its moisture retaining action, rough skin improving action and small skin wrinkle improving action, and exhibits superior usability.

[0011] The present invention provides a humectant characteristically comprising a diol represented by the following general formula (I):



wherein R denotes a straight chain or branched chain alkylene group represented by $-(\text{C}_n\text{H}_{2n})-$ and n denotes an integer 1-3.

[0012] Also, the present invention provides said humectant of wherein the diol represented by the general formula (I) is 1,4-butane diol.

[0013] Furthermore, the present invention provides said humectant wherein the diol represented by the general for-

mula (I) is 2-methyl-1,3-propane diol.

[0014] Also, the present invention provides an endermic liniment characteristically containing a diol represented by the following general formula (I):



wherein R denotes a straight chain or branched chain alkylene group represented by -(C_nH_{2n})- and n denotes an integer 1-3.

[0015] Furthermore, the present invention provides said endermic liniment wherein the diol represented by the general formula (I) is 1,4-butane diol.

[0016] Also, the present invention provides said endermic liniment wherein the diol represented by the general formula (I) is 2-methyl-1,3-propane diol.

[0017] Furthermore, the present invention provides said endermic liniment which characteristically contains said diol in the amount of 5-50 wt% of the total endermic liniment.

[0018] Also, the present invention provides said endermic liniment which additionally contains a triol which has four or three carbon atoms and three OH groups in the molecule in the amount of 3-20 wt% of the total endermic liniment.

[0019] Furthermore, the present invention provides said endermic liniment wherein the sum of said diol content and said triol content is 10-30 wt% of the total endermic liniment and the weight ratio of said diol content and said triol content is 1 : 3 to 10 : 1.

20 Detailed Description of the Invention

[0020] The configuration of the present invention is described in detail below.

[0021] The diol used in the present invention, represented by the aforementioned general formula (I), has the characteristic of both two hydroxyl groups being bonded to primary carbons. Examples include 1,3-propane diol, 2-methyl-1,3-propane diol, 1,4-butane diol and 1,5-pentane diol, among which 1,4-butane diol and 2-methyl-1,3-propane diol are particularly preferable.

[0022] The skin moisturizing effect of polyhydric alcohol is prior art knowledge. The present invention was completed by discovering the fact that the diol with the aforementioned structure, particularly 1,4-butane diol and 2-methyl-1,3-propane diol, exhibit a particularly prominent effect compared with conventional prior art humectants with polyhydric alcohol in terms of their long lasting high skin moisturizing effect and usability.

[0023] By using the diol with the aforementioned structure, an endermic liniment with a long lasting high skin moisturizing effect and superior usability can be manufactured. The blend ratio is preferably 5-50 wt%, more preferably 10-20 wt%, of the total amount of the endermic liniment. If it is less than 5 wt%, then the moisture retaining action will not be sufficient. If the blend ratio is 50 wt% or more, no additional improvement in the moisture retaining action is observed and the tactile feeling during use may deteriorate.

[0024] When triol with four or three carbon atoms and three OH groups in each of its molecules is blended in addition to the aforementioned essential ingredient in the endermic liniment of the present invention, the skin moisturizing effect and usability will improve. Examples of the triol with four or three carbon atoms and three OH groups in each of its molecules include glycerine, 1,2,3-butane triol and 1,2,4-butane triol.

[0025] The blend ratio of the aforementioned triol is 3-20 wt% of the total amount of the endermic liniment. The weight ratio between the aforementioned diol and the aforementioned triol is preferably 1 : 3 to 10 : 1, and more preferably 1 : 2 to 5 : 1. If the composition ratio of the aforementioned triol component compared with the aforementioned diol component increases, then the stickiness of the aforementioned triol component increases and usability deteriorates. If the composition ratio of the aforementioned triol component compared with the aforementioned diol component decreases, then the moisture retaining action decreases and the synergistic effect of mixing these two will be lost.

[0026] The endermic liniment of the present invention is a humectant composition and can be manufactured with a conventional method by, according to the target formulation, blending in ingredients which are generally used for ingredients of an endermic liniment including oils, surfactants, humectants other than described above, ultraviolet light absorbents, chelating agents, pH adjustment agents, preservatives, thickeners, pigments, perfume, drugs, etc., in addition to the aforementioned ingredients, within the range which does not affect the effect of the present invention.

[0027] The endermic liniment of the present invention can be in any formulation including a solution type, solubilized type, emulsion type, powder dispersion type, water-two phase type and water/oil/powder three phase type. The endermic liniment can be used for any application including liniments for the face, body, scalp or hair on the head such as a toilet water, emulsion, cream, pack and conditioner.

[0028] The endermic liniment in the present invention refers to a liniment which is applied on the skin or hair as a cosmetic, drug or quasi-drug.

[0029] The present invention can provide a humectant and an endermic liniment which exhibit a high and lasting skin

moisturizing effect for alleviation of dry skin, alleviation of small wrinkles on the skin, improvement in damaged hair, as well as superior tactile feeling during use.

Examples

5

[0030] Specific descriptions of the present invention are given below by referring to examples. The present invention is not limited to the following examples. The blend ratios are in weight percent units.

10

[0031] The skin moisturizing effect and usability of the humectant and the endermic liniment of the present invention were investigated. That is, based on the recipes in Table 1, the moisture retaining action and usability (tactile feeling during use) were evaluated by using the following testing methods. The results are also shown in Table 1.

[Testing method]

15

[0032] For a panel of ten evaluation specialists ($n = 10$), the medial aspect of the forearm was cleaned with a soap and, after 30 minutes in a 23°C and 50%RH constant temperature and constant humidity chamber, the moisture content in the corneum was measured using a high frequency impedance meter (Skicon 200 from IBS). One microliter/cm² of the toilet water of the aforementioned Table 1 was applied on the testing site and, after six hours, the toilet water on the skin was removed by cleaning with a soap. The moisture content in the corneum was measured under the same conditions as before the application. The skin moisture retaining action was evaluated by using the corneum moisture content ratio before and after the application.

20

[0033] The moisture retaining actions were evaluated based on the average for $n = 10$ using the following evaluation criteria. A higher value indicates a higher skin moisturizing effect on the skin.

"Evaluation criteria"

25

[0034]

30

- ◎: 1.6 or higher
- : 1.3-1.5
- △: 1-1.2
- X: lower than 1

[0035] The tactile feeling during use (usability) was evaluated based on the number of people out of $n = 10$ who judged "good" using the following criteria.

35

"Evaluation criteria"

[0036]

40

- ◎: Eight or more out of ten reported the tactile feeling during use was good.
- : Six or seven out of ten reported the tactile feeling during use was good.
- △: Four or five out of ten reported the tactile feeling during use was good.
- X: Three or less out of ten reported the tactile feeling during use was good.

45

50

55

Table 1

	Comparative example 1	Comparative example 2	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6
Dipropylene glycol	10	-	-	-	-	-	-	-
1,3-butylene glycol	-	10	-	-	-	-	-	-
1,4-butane diol	-	-	10	-	4	5	20	50
2-methyl-1,3-propane diol	-	-	-	10	-	-	-	-
Glycerine	-	-	-	-	-	-	-	-
Ion exchanged water	90	90	90	90	96	95	80	50
Total	100	100	100	100	100	100	100	100
Moisture retaining action	x	x	○	○	△	○	◎	◎
Tactile feeling during use	○	○	◎	○	◎	◎	○	△

	Comparative example 3	Comparative example 4	Example 7	Example 8	Example 9	Comparative example 5	Example 10
1,3-butylene glycol	-	3	-	-	-	15	-
1,4-butane diol	-	-	3	5	10	-	15
Glycerine	10	7	7	5	5	3	3
Ion exchanged water	90	90	90	90	85	82	82
Total	100	100	100	100	100	100	100
Moisture retaining action	◎	△	○	○	◎	x	◎
Tactile feeling during use	x	△	○	○	○	○	○

[0037] As clearly shown in Table 1, the diol which is the humectant of the present invention has a superior moisture retaining action compared with 1,3-butylene glycol and/or dipropylene glycol and also exhibits good insubility (Example 40 1 and Comparative examples 1 and 2). As for the diol content of the endermic liniment of the present invention, it was observed that the skin moisturizing effect is low if it is less than 5 wt%, and there was a tendency to have a poorer tactile

feeling during use if it is 50 wt% or more (Examples 3-5). As for the cases where glycerine, a triol component, was added, partial substitutions of 1,3-butylene glycol for glycerine revealed that the skin moisturizing effect decreases with less glycerine whereas, when 1,4-butane diol is substituted, the skin moisturizing effect is maintained and the tactile 45 feeling during use, which is characteristically poor when glycerine is used, is improved (Comparative examples 4 and 7).

[0038] The rough skin alleviating effect (the skin improving effect) and the small skin wrinkle alleviating effect (the wrinkle improving effect) of the endermic liniment of the present invention were verified by the actual use test. For the 50 actual use test, a panel of 20 female evaluation specialists were divided into two groups and the first group used the toilet waters of Example 11 and Comparative example 6 and the second group used the creams of Example 12 and Comparative example 7; an appropriate amount was applied onto the right and the left halves of the face, respectively, after washing the face twice a day, in the morning and the evening, for two weeks. The rough skin improving effect and the small skin wrinkle improving effect were evaluated based on the numbers of people who reported "effective", "somewhat effective" and "not effective". At the same time, the tactile feeling during use (usability) was evaluated using the same evaluation criteria as in said Example 1. The results are shown in Table 2.

Example 11 Toilet water

[0039] The toilet water was prepared using the following recipe with a conventional method.

5

10

15

20

25

30

35

40

45

Ethanol	8 wt%
2-methyl-1,3-propane diol	5
Glycerine	5
Polyoxyethylene (20 moles) oleyl alcohol ether	1.5
Pullulan	0.05
Jojoba oil	0.5
Caustic potash	0.015
EDTA-3Na	0.01
Preservative	Appropriate amount
Perfume	Appropriate amount
Ion exchanged water	Balance

Comparative example 6 Toilet water

[0040] Preparation was carried out in the same manner as in Example 11.

Ethanol	8 wt%
Dipropylene glycol	5
Glycerine	5
Polyoxyethylene (20 moles) oleyl alcohol ether	1.5
Pullulan	0.05
Jojoba oil	0.5
Caustic potash	0.015
EDTA-3Na	0.01
Preservative	Appropriate amount
Perfume	Appropriate amount
Ion exchanged water	Balance

Example 12 Cream

[0041] The cream was prepared using the following recipe with a conventional method.

50

55

Polyethylene glycol 4000	1 wt%
1,4-butane diol	5
2-methyl-1,3-propane diol	5
Glycerine	5

(continued)

5	Squalane	20
	Vaseline	5
10	Cetostearyl alcohol	3
	Polyoxyethylene (20 moles) oleyl alcohol ether	1.5
	Glyceryl monostearate	1.5
15	Urea	2
	Sodium lactate	1
	Xanthan gum	0.05
	Preservative	Appropriate amount
20	Caustic potash	0.01
	EDTA-3Na	0.01
	Preservative	Appropriate amount
	Ion exchanged water	Balance

Comparative example 7 Cream

[0042] Preparation was carried out in the same manner as in Example 12.

30	Polyethylene glycol 4000	1 wt%
	1,3-butylene glycol	10
35	Glycerine	5
	Squalane	20
	Vaseline	5
	Cetostearyl alcohol	3
	Polyoxyethylene (20 moles) oleyl alcohol ether	1.5
	Glyceryl monostearate	1.5
40	Urea	2
	Sodium lactate	1
	Xanthan gum	0.05
45	Preservative	Appropriate amount
	Caustic potash	0.01
	EDTA-3Na	0.01
	Preservative	Appropriate amount
50	Ion exchanged water	Balance

Table 2

	Example 11	Comparative example 6	Example 12	Comparative example 7
"Rough skin improving effect"				
Effective	5	2	7	3
Somewhat effective	4	3	3	3
Not effective	1	5	0	4
Efficacy ratio	90%	50%	100%	60%
"Small skin wrinkle improving effect"				
Effective	2	1	4	2
Somewhat effective	3	2	4	2
Not effective	5	7	2	6
Efficacy ratio	50%	30%	80%	40%
"Tactile feeling during use"	◎	○	◎	○

[0043] As clearly shown in Table 2, the endermic liniment of the present invention was superior in terms of its rough skin improving effect and small skin wrinkle improving effect, and also exhibited good usability.

[0044] Other examples of the endermic liniment of the present invention are shown below.

Example 13 Emulsion

[0045] The emulsion was prepared using the following recipe with a conventional method.

2-methyl 1,3-propane diol	7
Glycerine	5
Sodium pyrrolidonecarboxylate	0.5
Squalane	5
Vaseline	1
Cetostearyl alcohol	0.3
Polyoxyethylene (20 moles) oleyl alcohol ether	1.5
Sodium polyacrylate	0.03
Preservative	0.2
Caustic potash	0.1
EDTA-3Na	0.03
Perfume	Appropriate amount
Ion exchanged water	Balance

Comparative example 8 Emulsion

[0046] Preparation was carried out in the same manner as in Example 13.

5	1,3-butylene glycol	7
	Glycerine	5
	Sodium pyrrolidonecarboxylate	0.5
	Squalane	5
10	Vaseline	1
	Cetostearyl alcohol	0.3
	Polyoxyethylene (20 moles) oleyl alcohol ether	1.5
	Sodium polyacrylate	0.03
15	Preservative	0.2
	Caustic potash	0.1
	EDTA-3Na	0.03
20	Perfume	Appropriate amount
	Ion exchanged water	Balance

Example 14 Cream

[0047] The cream was prepared using the following recipe with a conventional method.

30	1,4-butane diol	15 wt%
	Glycerine	3
	Erythritol	1
35	Cetostearyl alcohol	4
	Vaseline	5
	Squalane	3
	Jojoba oil	3
40	Dimethyl silicone (6mPa · s)	5
	Glyceryl monostearate	2.5
	Polyoxyethylene (5 moles) glyceryl monostearate	1.5
45	Polyoxyethylene (20 moles) oleyl alcohol ether	3
	Vitamin E acetate	0.05
	Preservative	Appropriate amount
	EDTA-3Na	0.03
50	Perfume	Appropriate amount
	Ion exchanged water	Balance

55 Comparative example 9 Cream

[0048] Preparation was carried out in the same manner as in Example 14.

5	Dipropylene glycol	15 wt%
	Glycerine	3
10	Erythritol	1
	Cetostearyl alcohol	4
15	Vaseline	5
	Squalane	3
	Jojoba oil	3
	Dimethyl silicone (6mPa · s)	5
	Glyceryl monostearate	2.5
20	Polyoxyethylene (5 moles) glyceryl monostearate	1.5
	Polyoxyethylene (20 moles) oleyl alcohol ether	3
	Vitamin E acetate	0.05
	Preservative	Appropriate amount
25	EDTA-3Na	0.03
	Perfume	Appropriate amount
	Ion exchanged water	Balance

Example 15 Hair treatment

30 [0049] The hair treatment was prepared using the following recipe with a conventional method.

35	1,4-butane diol	10 wt%
	Cetostearyl alcohol	3
	Stearyltrimethylammonium chloride	2
40	Dimethyl silicone (20mPa · s)	10
	Preservative	Appropriate amount
	Perfume	Appropriate amount
	Ion exchanged water	Balance

45

Comparative example 10 Hair treatment

[0050] Preparation was carried out in the same manner as in Example 15.

50

55	1,3-butane diol	10 wt%
	Cetostearyl alcohol	3
	Stearyltrimethylammonium chloride	2
	Dimethyl silicone (20mPa · s)	10

(continued)

Preservative	Appropriate amount
Perfume	Appropriate amount
Ion exchanged water	Balance

[0051] Compared with Comparative example 10, the hair treatment of Example 15 had an improved moisture retaining action and superior usability.

10 Claims

1. A humectant characteristically comprising a diol represented by the following general formula (I):



wherein R denotes a straight chain or branched chain alkylene group represented by $-(\text{C}_n\text{H}_{2n})-$ and n denotes an integer 1-3.

20 2. The humectant of claim 1 wherein the diol represented by the general formula (I) is 1,4-butane diol.

3. The humectant of claim 1 wherein the diol represented by the general formula (I) is 2-methyl-1,3-propane diol.

4. An endermic liniment characteristically containing a diol represented by the following general formula (I):



wherein R denotes a straight chain or branched chain alkylene group represented by $-(\text{C}_n\text{H}_{2n})-$ and n denotes an integer 1-3.

30 5. The endermic liniment of claim 4 wherein the diol represented by the general formula (I) is 1,4-butane diol.

6. The endermic liniment of claim 4 wherein the diol represented by the general formula (I) is 2-methyl-1,3-propane diol.

35 7. The endermic liniment of claim 4, 5, or 6 which characteristically contains the diol of claim 4, 5, or 6 in the amount of 5-50 wt% of the total endermic liniment.

40 8. The endermic liniment of claim 4, 5, 6, or 7 which additionally contains a triol which has four or three carbon atoms and three OH groups in the molecule in the amount of 3-20 wt% of the total endermic liniment.

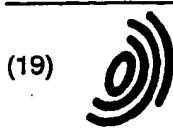
9. The endermic liniment of claim 8 wherein the sum of said diol content and said triol content is 10-30 wt% of the total endermic liniment and the weight ratio of said diol content and said triol content is 1 : 3 to 10 : 1.

45

50

55

This PAGE BLANK (USPTO)



Europäisches Patentamt

(19)

European Patent O

Office européen des brevets



(11)

EP 0 922 448 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
03.05.2000 Bulletin 2000/18

(51) Int. Cl.⁷: A61K 7/48

(43) Date of publication A2:
16.06.1999 Bulletin 1999/24

(21) Application number: 98122683.0

(22) Date of filing: 30.11.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE

Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 01.12.1997 JP 34577497

(71) Applicant:
SHISEIDO COMPANY LIMITED
Chuo-ku, Tokyo 104-8010 (JP)

(72) Inventors:

- Okamoto, Tohru
c/o Shiseido Research Center 1,
Yokohama-shi, Kanagawa 223-8553 (JP)
- Miyahara, Reiji
c/o Shiseido Research Center 1,
Yokohama-shi, Kanagawa 223-8553 (JP)

(74) Representative:

TER MEER STEINMEISTER & PARTNER GbR
Patentanwälte,
Mauerkircherstrasse 45
81679 München (DE)

(54) A humectant and an endermic liniment

(57) A humectant characteristically comprises a diol
represented by the following general formula (I):



Wherein R denotes a straight chain or branched
chain alkylene group represented by $-(\text{C}_n\text{H}_{2n})-$ and n
denotes an integer 1-3. This a humectant has superior
moisture retaining properties and a long lasting skin
moisturizing effect, as well as superior usability.

EP 0 922 448 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 98 12 2683

DOCUMENTS CONSIDERED TO BE RELEVANT					
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.)		
X	SPARKS KATHleen ET AL: "MP Diol glycol: a new raw material for personal care" DRUG AND COSMETIC INDUSTRY, 1 March 1997 (1997-03-01), XP002080226 * page 30 *	1,3,4,6, 7	A61K7/48		
X	US 5 389 132 A (DAVULCU AKIN H ET AL) 14 February 1995 (1995-02-14) * column 2, line 59 - line 68 * * column 4, line 32 - line 34 * * example 6 * * claims 1,3,4 *	1,3			
P,X	US 5 798 111 A (KANGA VISPI DORAB ET AL) 25 August 1998 (1998-08-25) * column 2, line 42 - line 60 * * claims 1,5,6 *	1,3,4, 6-9			
X	DATABASE WPI Section Ch, Week 198207 Derwent Publications Ltd., London, GB; Class A96, AN 1982-12595E XP002132535 & JP 57 002212 A (POLA KASEI KOGYO KK), 7 January 1982 (1982-01-07) * abstract *	1,2,4,5	TECHNICAL FIELDS SEARCHED (Int.Cl.) A61K		
A	PATENT ABSTRACTS OF JAPAN vol. 017, no. 674 (C-1140), 10 December 1993 (1993-12-10) & JP 05 221821 A (SAKAMOTO YAKUHIN KOGYO KK), 31 August 1993 (1993-08-31) * abstract *	1			
The present search report has been drawn up for all claims					
Place of search	Date of completion of the search	Examiner			
BERLIN	8 March 2000	Pelli Wablat, B			
CATEGORY OF CITED DOCUMENTS					
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document					
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document					

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 12 2683

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
 The members are as contained in the European Patent Office EDP file on
 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-03-2000

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 5389132 A	14-02-1995	NONE		
US 5798111 A	25-08-1998	AU 8108098 A	19-01-1999	
		WO 9900103 A	07-01-1999	
JP 57002212 A	07-01-1982	NONE		
JP 05221821 A	31-08-1993	NONE		

THIS PAGE BLANK (USPTO)

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER: _____**

**IMAGES ARE BEST AVAILABLE COPY.
As rescanning these documents will not correct the image
problems checked, please do not report these problems to
the IFW Image Problem Mailbox.**

THIS PAGE BLANK (USPTC)